

## ABSTRACT

DIANA is a block-oriented interpretive program which can be used to simulate physical systems by solving the simultaneous differential equations describing the systems. The program behaves much like an analog computer, with on-line control and input-output capabilities.

Available DIANA integration methods include: fifth-order Adams-Moulton, with adaptive step size; fixed-step Adams method; and Runge-Kutta-Gill method.

## I. INTRODUCTION

The DIANA program is modeled closely after its predecessor PACTOLUS, Ref. 1, which first demonstrated the operational flexibility that can be achieved with a comparatively small computer, using the operating console as an appropriate man-machine interface. DIANA uses the same basic interconnection language and sorting procedure of PACTOLUS, but strives to further improve the man-machine relationship in three ways:

1. To expand and optimize the input-output capabilities.
2. To permit additional flexibility in altering the program in "mid-stream" and continuing.
3. To minimize the computational time by providing:
  - a. A choice of integration schemes, including a variable step size adaptive routine.
  - b. A method of handling discontinuous functions to minimize their effect on computation time.

It was hoped that the interface could be improved to the point where fairly large, complex simulations, previously reserved for the IBM 7090 and MIDAS, Ref. 2, could be handled.

## II. MACHINE REQUIREMENTS

DIANA is written in a FORTRAN II-D Printer version, and requires a 40-k memory, 1311 disk drive, card read-punch, 1627 plotter with PLOT and CHAR subroutines<sup>1</sup>, and 1443 printer.

<sup>1</sup>Integration subroutine is written in SPS (Symbolic Programming System).